Intelligent Camera Aided Railway Emergency System (i-CARES)

Technology Transfer Activities

by

Yu Qian
Assistant Professor
Department of Civil and Environmental Engineering
The University of South Carolina
300 Main Street-C228
Columbia, SC 29208
Office: (803)777-8184
Email: yuqian@sc.edu

Yi Wang, University of South Carolina
Dimitris Rizos, University of South Carolina

February 2021

Center for Connected Multimodal Mobility (C²M²)

Center for Connected Multimodal Mobility (C²M²)

200 Lowry Hall, Clemson University
Clemson, SC 29634
DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated in the interest of information exchange. The report is funded, partially or entirely, by the Center for Connected Multimodal Mobility (C²M²) (Tier 1 University Transportation Center) Grant, which is headquartered at Clemson University, Clemson, South Carolina, USA, from the U.S. Department of Transportation's University Transportation Centers Program. However, the U.S. Government assumes no liability for the contents or use thereof.

Non-exclusive rights are retained by the U.S. DOT.
ACKNOWLEDGMENT

The research team greatly thank C²M² for partially support this project. CSX Corporation and the City of Columbia also provide tremendous support and a lot of useful advice during the development.
# Table of Contents

DISCLAIMER ................................................................................................................... ii
ACKNOWLEDGMENT .................................................................................................... iii

1 Outputs ...................................................................................................................... 1
2 Outcomes .................................................................................................................. 1
3 Impacts ...................................................................................................................... 1
TECHNOLOGY TRANSFER ACTIVITIES

1 Outputs

The project outputs include two conference presentations that analyze vehicle behavior in front of railroad crossings.

1.1 Output #1
Initial results of this project were presented at the 3rd Annual C²M² Fall Conference, October 18, 2019, held at Clemson University.

Feng Guo, Yi Wang, and Dimitris Rizos (2019) “Real-Time Traffic Assessment at the Railroad Grade Crossing”

1.2 Output #2
The initial results of this project were presented at the 99th Annual Transportation Research Board Meeting held January 11-15, 2020, in Washington D.C.

Guo, F., Y. Qian, Y. Wang, D. Rizos, S. Wang, and H. Yu., (2020) "Real-Time Traffic Congestion Assessment and Decongestion Time Prediction at Grade Crossing for the First Responders" Transportation Research Board Annual Meeting

2 Outcomes

The primary outcome of this research is a model, which features training that can be used to detect and track vehicles at the grade crossing in real-time.

2.1 Outcome #1
Development of artificial intelligent models that can assess traffic conditions at grade crossings.

3 Impacts

The developed model is the initial effort to develop a sophisticated system that can be used by both the railroads and traffic management departments. CSX has expressed interest in this system.

3.1 Impact #1
The developed model can capture real-time crossing traffic conditions. In case of emergency, i.e. vehicles get stuck at the crossing, this frame can be extracted and shared with the railroads for preventive actions.

3.2 Impact #2
The developed model can help to assess traffic congestion conditions at the crossing, which can be used to improve traffic planning and operation.